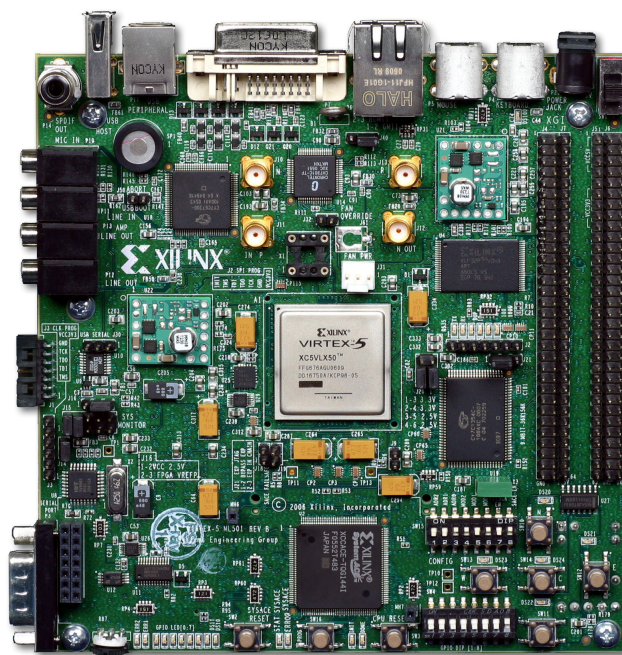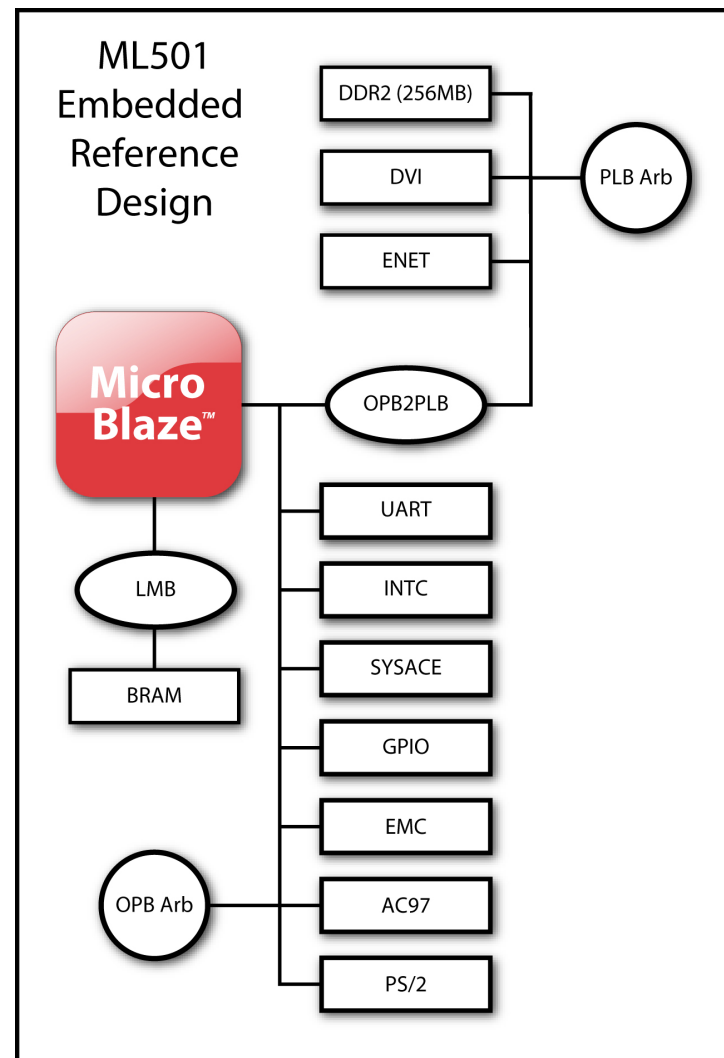# ML501 QuickStart

May 2008

Overview

- Setup

- Boot with ACE-loader ACE File

- Observe LCD and Terminal messages

- Load new Configuration

- Re-load ACE-loader

ML501 MicroBlaze Hardware

- The ML501 MicroBlaze design hardware includes:
  - DDR2 Interface (256 MB)
  - BRAM
  - External Memory Controller (EMC)
    - ZBT SRAM, Flash, and USB
  - Networking
  - UART
  - Interrupt Controller
  - System ACE CF Interface
  - GPIO (IIC, LEDs and LCD)
  - AC97, and PS/2 Controllers
  - DVI Controller
  - PLB and OPB Arbiters
  - OPB2PLB Bridge

ML501 Embedded Reference Design

DDR2 (256MB)
DVI
ENET
PLB Arb
Micro Blaze™
OPB2PLB
UART
INTC
SYSACE
GPIO
EMC
AC97
PS/2
LMB
BRAM
OPB Arb

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Additional Setup Details

- Refer to ml501_overview_setup document for details on:
    - Software Requirements

    - ML501 Board Setup

        - **Equipment and Cables**

        - **Software**

        - **Network**

    - Terminal Programs

        - **This presentation requires the 9600-8-N-1 Baud terminal setup**

ML501 Overview and Setup
Overview of the Hardware Designs and Software Applications
How to set up the equipment, software, CompactFlash, network, and terminal programs

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Hardware Setup

- Connect the Xilinx Parallel Cable IV (PC4) to the ML501 board

- Connect the RS232 null modem cable to the ML501 board

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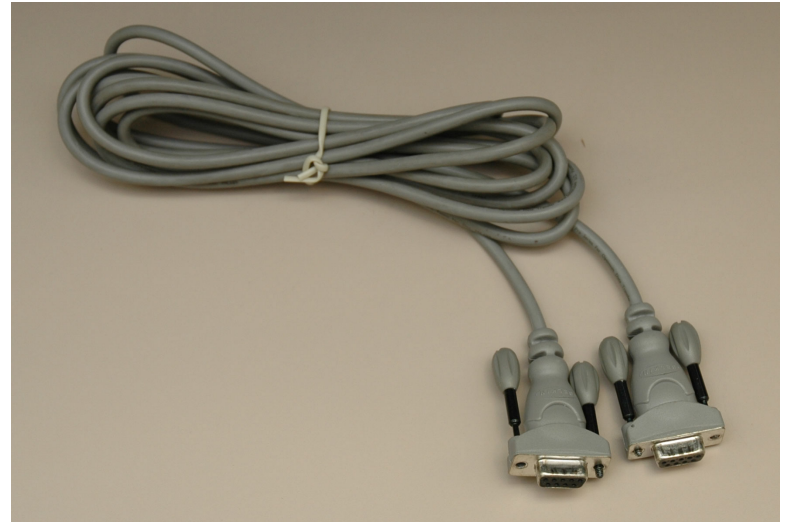
Hardware Setup

- The ML501 uses a DVI video interface

- Connect a DVI monitor

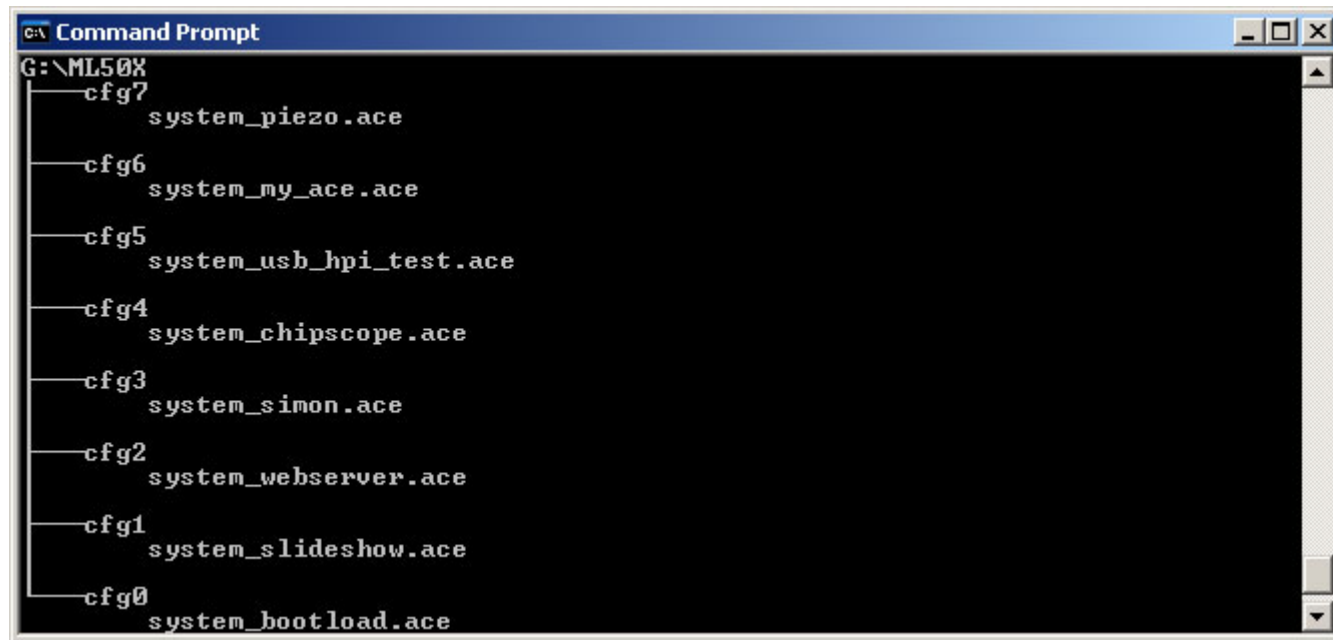 *or*

- Use a DVI/VGA adapter to connect a VGA monitor

  – http://www.belkin.com

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Hardware Setup

- USB Keyboard
  - www.dell.com

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Factory CompactFlash

- The CompactFlash shipped with the ML501 board has the following ace files preloaded:

```
Command Prompt                                          _ □ X
G:\ML50X
  ├──cfg7
  │      system_piezo.ace
  │
  ├──cfg6
  │      system_my_ace.ace
  │
  ├──cfg5
  │      system_usb_hpi_test.ace
  │
  ├──cfg4
  │      system_chipscope.ace
  │
  ├──cfg3
  │      system_simon.ace
  │
  ├──cfg2
  │      system_webserver.ace
  │
  ├──cfg1
  │      system_slideshow.ace
  │
  ├──cfg0
         system_bootload.ace
```
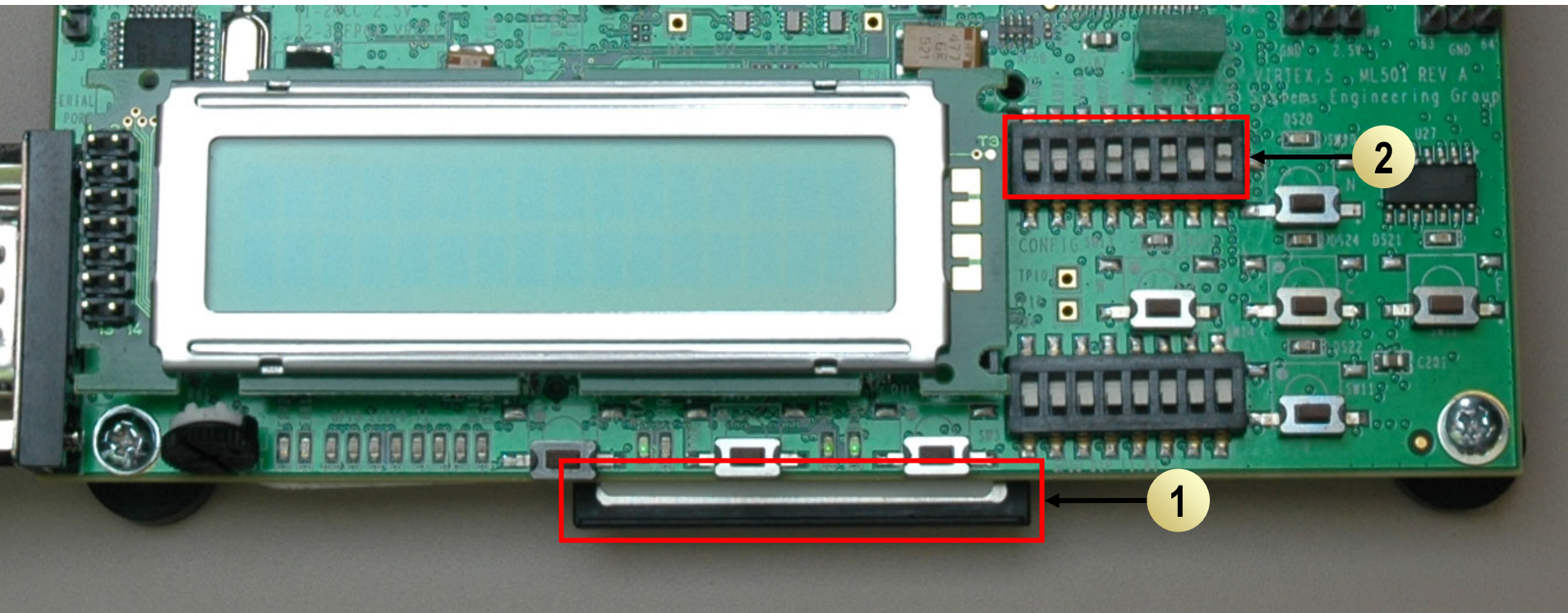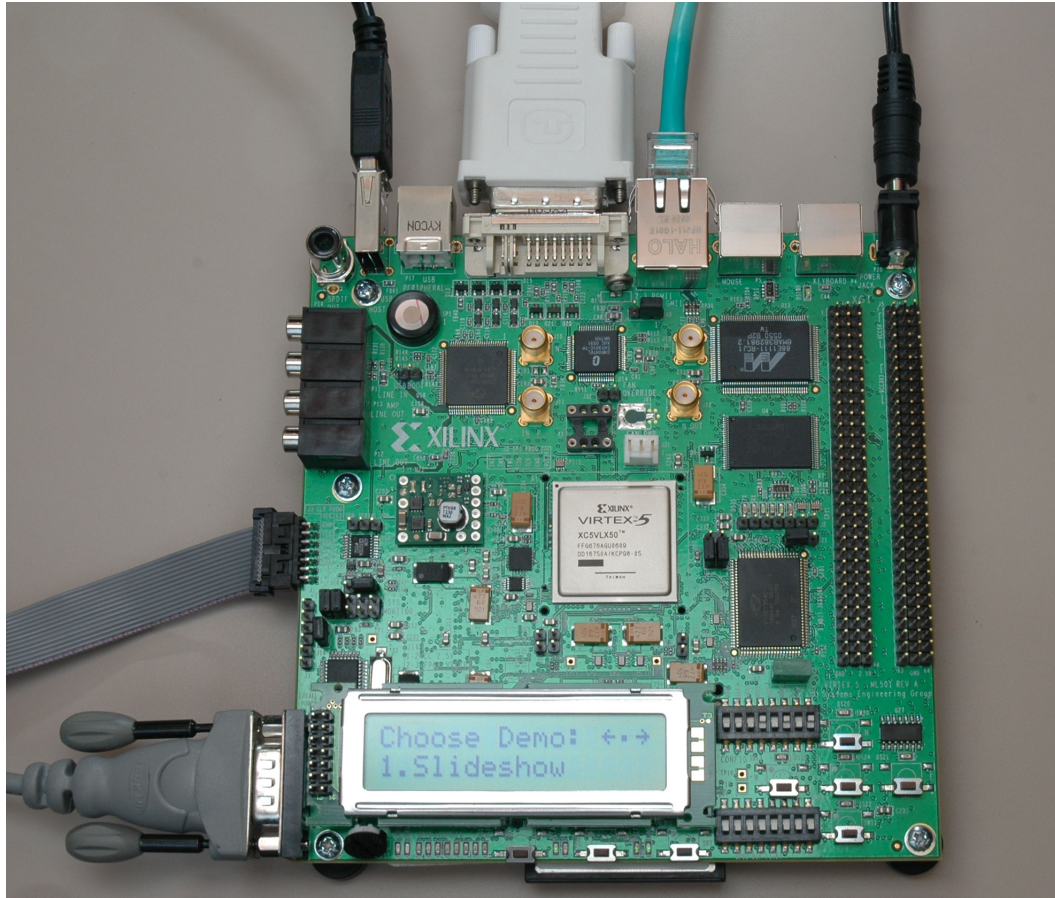
Select Boot Configuration

- Insert the Factory CompactFlash into the ML501 board (1)

- Set the DIP switches as seen here (00010101) (2)
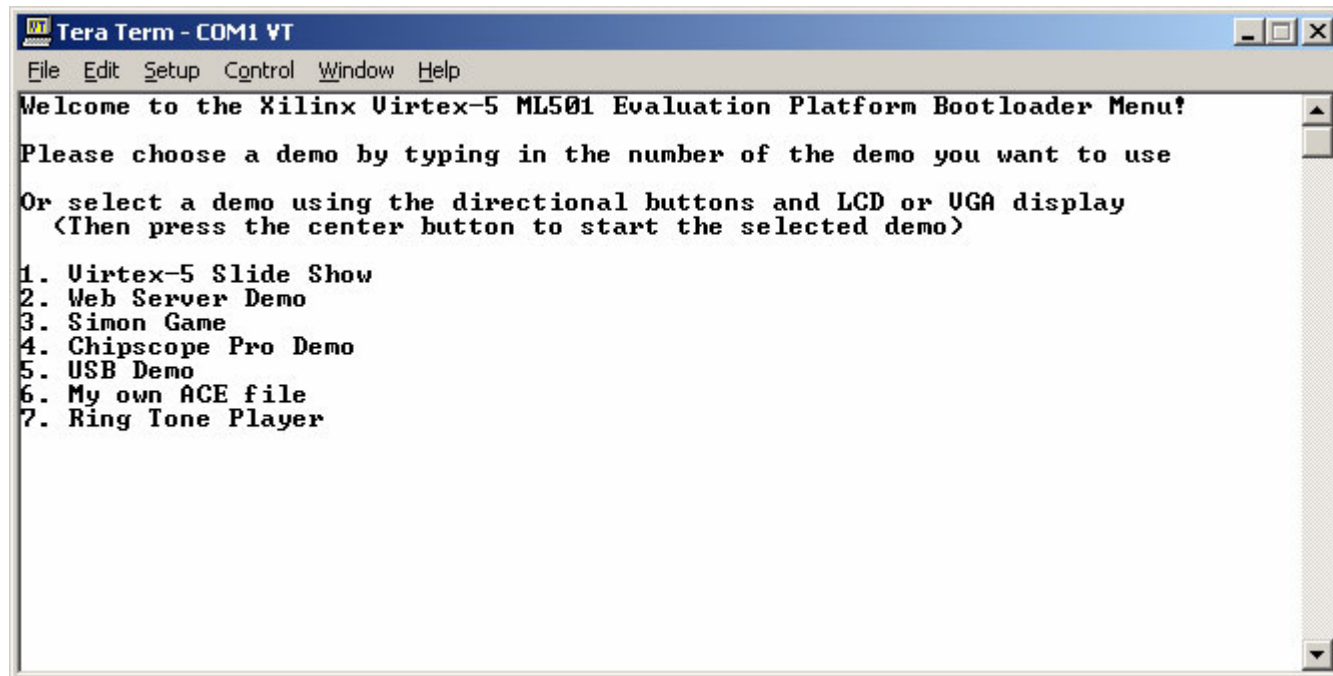
- Power-up the ML501 board

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Bootload

- The system_bootload.ace loads:

Bootload

- The terminal window also reflects the bootload application

- Use the left/center/right buttons to choose an application or type a number in the terminal window

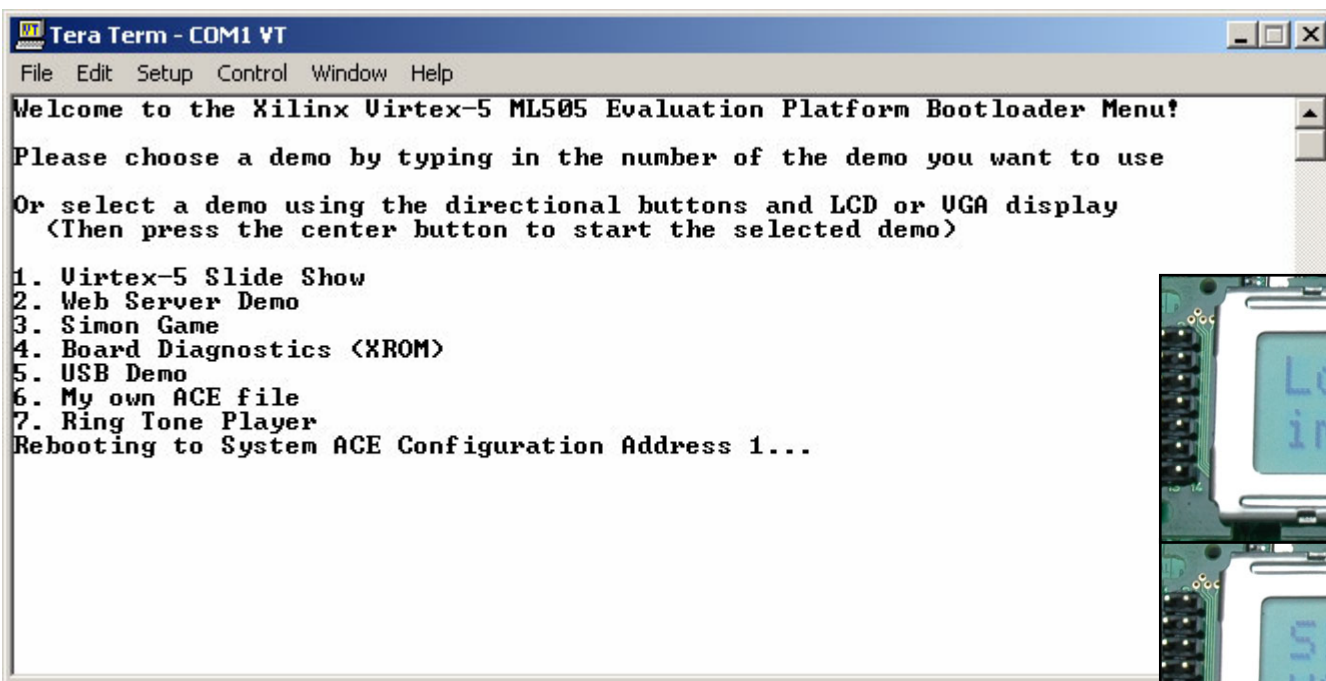- After each demo, push the SysACE reset to return to bootload

Slideshow

- Type 1, to launch the slideshow application in Configuration 1
- The slideshow loads the presentation into memory then presents it

Slideshow

- The slideshow app will present a series of slides on the Monitor:

Web Server

- Type 2, to launch the web server application in Configuration 2
  - **Note**: You may need to turn off your browser's proxy and specify a direct connection to the Internet in your browser options


```
Tera Term - COM1 VT

File  Edit  Setup  Control  Window  Help

Rebooting to System ACE Configuration Address 2...
Welcome to the ML50x Webserver Demo

This demonstration is an Ethernet controlled GPIO interface. A remote
host running a web browser can read the value of the ML50x DIP switches or
set the LEDs on the board. Refreshing the remote PC's browser causes the
background color to change and the current DIP switch values to be read.
By default, the IP address of the board is 1.2.3.4 but can be changed by
recompiling the software.

Instructions for running this demo:
1. Connect Ethernet cable (straight or crossover) from your host to this board.
2. Configure the remote host's IP address to 1.2.3.9
3. Make sure the connection is running at 10 or 100 mbps and link lights are on
4. On the remote host, open a web browser connection to http://1.2.3.4:8080
   Follow the instructions on the loaded web page
5. On the remote host, you can also ping 1.2.3.4 to see the connection

Now Starting Webserver Demo...
(Note: status messages are output to the UART)

ip: 1.2.3.4
```


ML50x = http:// 1.2.3.4:8080

Note: Host IP is 1.2.3.9, subnet mask is 255.0.0.0; Ethernet connection is 100 Full Duplex

Web Server

- In your web browser, enter http://1.2.3.4:8080/index.html
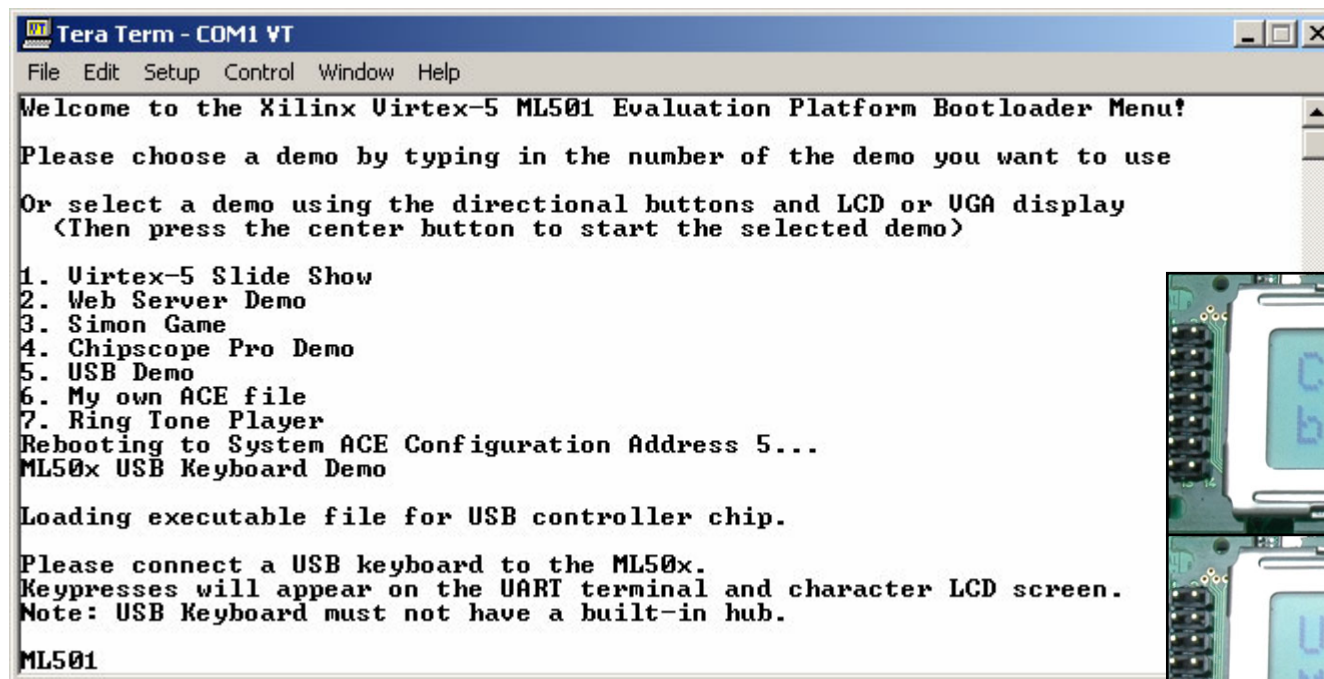
Simon

- Type 3, to launch the Simon application in Configuration 3


```
Tera Term - COM1 VT
File  Edit  Setup  Control  Window  Help

Welcome to the Xilinx Virtex-5 ML501 Evaluation Platform Bootloader Menu!

Please choose a demo by typing in the number of the demo you want to use

Or select a demo using the directional buttons and LCD or VGA display
   (Then press the center button to start the selected demo)

1. Virtex-5 Slide Show
2. Web Server Demo
3. Simon Game
4. Chipscope Pro Demo
5. USB Demo
6. My own ACE file
7. Ring Tone Player
Rebooting to System ACE Configuration Address 3...
```

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USB Keyboard

- Type 5, to launch the USB Keyboard application in Configuration 5
- Type **ML501** and view results:

My ACE

- Type 6, to launch the My ACE application in Configuration 6
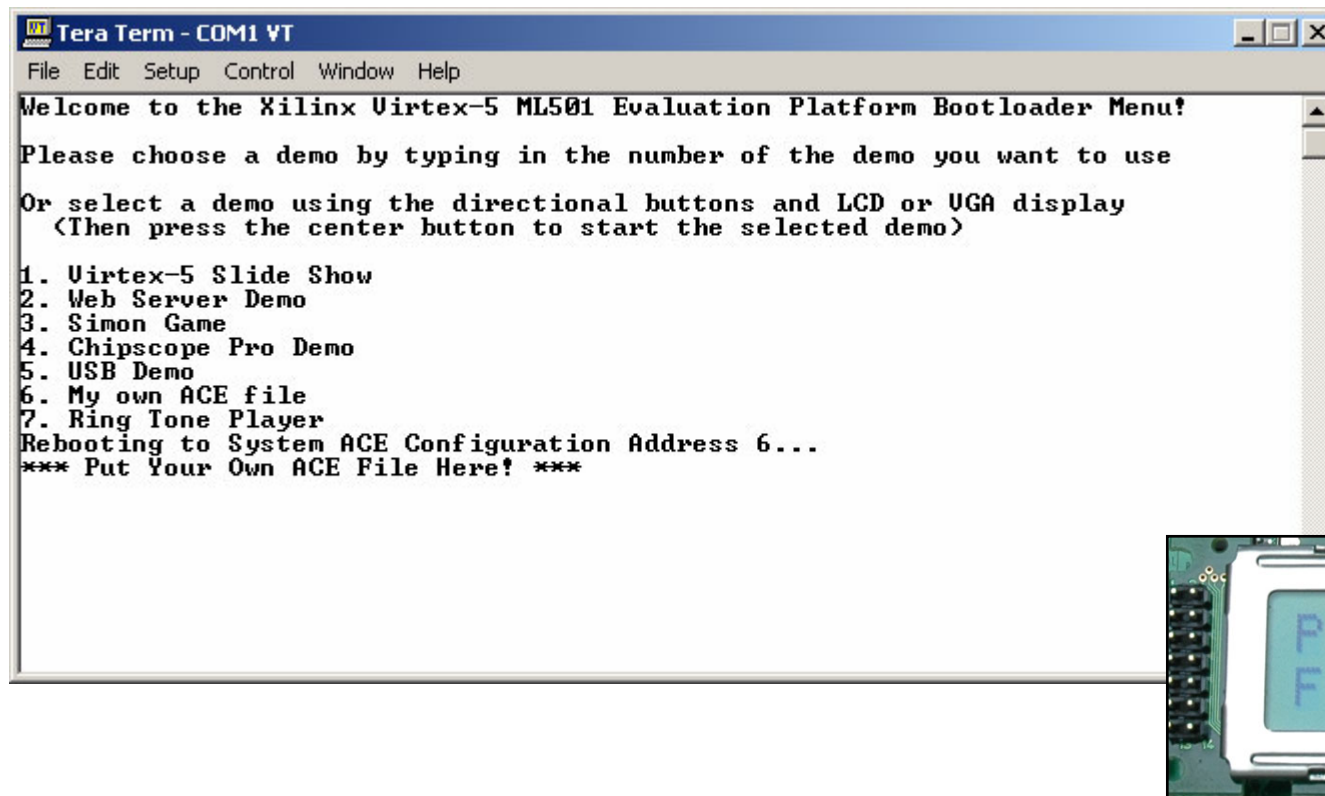
Ringtone

- Type 7, to launch the Ringtone application in Configuration 7
- Press any key then press 1-7 to play a simple melody


```
Tera Term - COM1 VT                                          _ □ X
File  Edit  Setup  Control  Window  Help
iles:
a:\ringtone\5thSym.txt
a:\ringtone\OdeToJoy.txt
a:\ringtone\MozartE.txt
a:\ringtone\MozartR.txt
a:\ringtone\BachMin.txt
a:\ringtone\Enter.txt
a:\ringtone\User.txt

Press any key to continue after CF is inserted.


**********      Pick a Ringtone      **********

1. Beethoven  - 5th Symphony
2. Beethoven  - Ode to Joy
3. Mozart     - Eine Kleine Nachtmusik
4. Mozart     - Rondo Alla Turca
5. Bach       - Minuet
6. Joplin     - Entertainer
7. User       - From file 'User.txt'
8. User       - Type in your ringtone
```
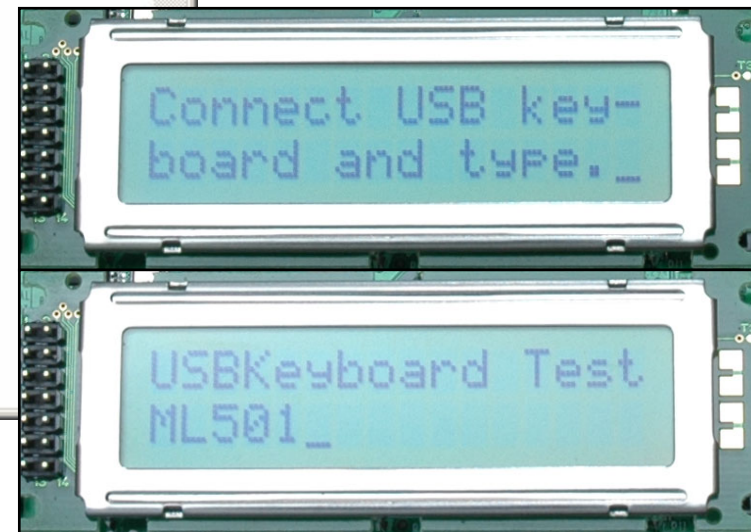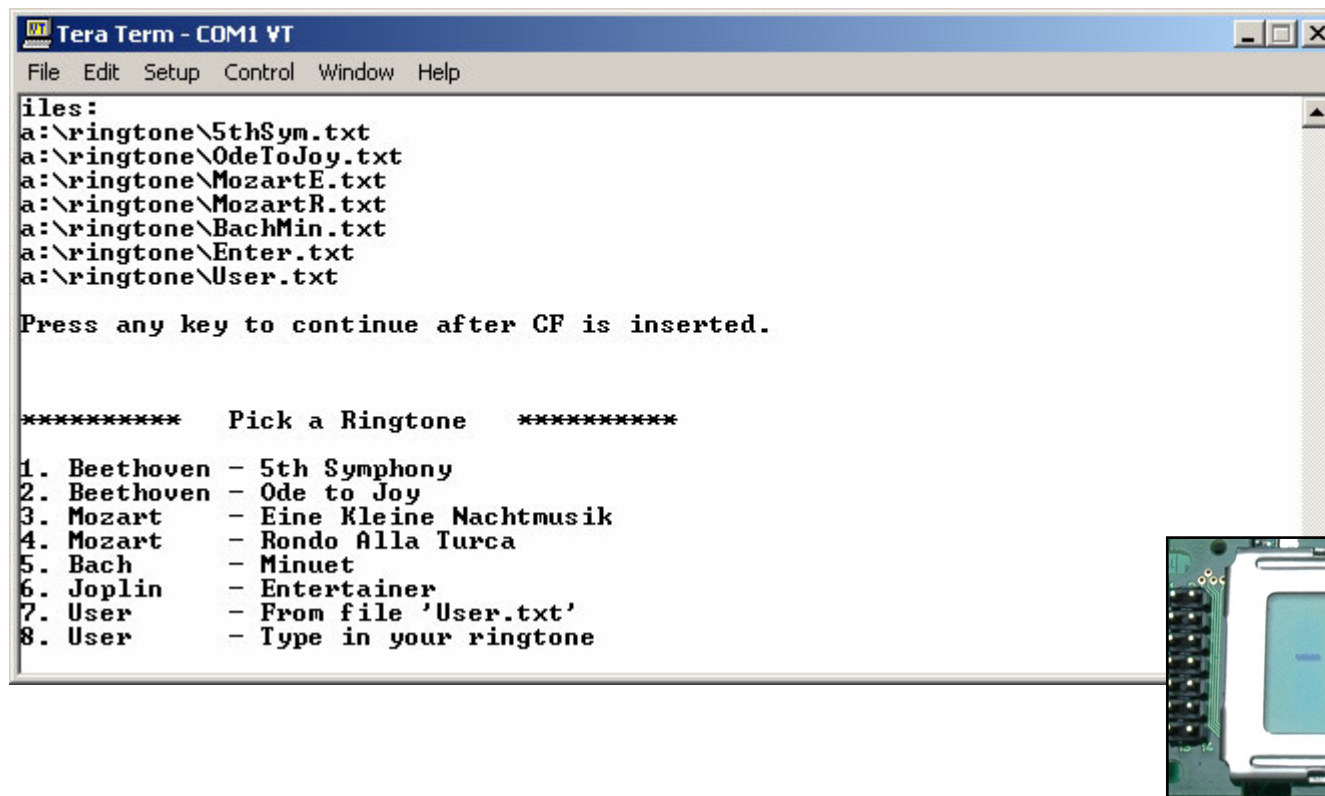
Documentation

- Virtex-5
  - Silicon Devices

    http://www.xilinx.com/products/silicon_solutions
  - Virtex-5 Multi-Platform FPGA

    http://www.xilinx.com/products/silicon_solutions/fpgas/virtex/virtex5
  - Virtex-5 Family Overview: LX, LXT, SXT, and FXT Platforms

    http://www.xilinx.com/support/documentation/data_sheets/ds100.pdf
  - Virtex-5 FPGA DC and Switching Characteristics Data Sheet

    http://www.xilinx.com/support/documentation/data_sheets/ds202.pdf

Documentation

- Virtex-5
  - Virtex-5 FPGA User Guide

    http://www.xilinx.com/support/documentation/user_guides/ug190.pdf
  - Virtex-5 FPGA Configuration User Guide

    http://www.xilinx.com/support/documentation/user_guides/ug191.pdf
  - Virtex-5 System Monitor User Guide

    http://www.xilinx.com/support/documentation/user_guides/ug192.pdf
  - Virtex-5 Packaging and Pinout Specification

    http://www.xilinx.com/support/documentation/user_guides/ug195.pdf

Documentation

- Design Resources
  - ISE Development Tools and IP

    http://www.xilinx.com/ise

  - Integrated Software Environment (ISE) Foundation Resources

    http://www.xilinx.com/ise/logic_design_prod/foundation.htm

  - ISE Manuals

    http://www.xilinx.com/support/software_manuals.htm

  - ISE Development System Reference Guide

    http://toolbox.xilinx.com/docsan/xilinx10/books/docs/dev/dev.pdf

  - ISE Development System Libraries Guide

    http://toolbox.xilinx.com/docsan/xilinx10/books/docs/virtex5_hdl/virtex5_hdl.pdf

Documentation

- Additional Design Resources
  - Customer Support

    http://www.xilinx.com/support
  - Xilinx Design Services:

    http://www.xilinx.com/xds
  - Titanium Dedicated Engineering:

    http://www.xilinx.com/titanium
  - Education Services:

    http://www.xilinx.com/education
  - Xilinx On Board (Board and kit locator):

    http://www.xilinx.com/xob

Documentation

- MicroBlaze
  - MicroBlaze Processor

    http://www.xilinx.com/microblaze
  - MicroBlaze Processor Reference Guide – UG081

    http://www.xilinx.com/support/documentation/sw_manuals/mb_ref_guide.pdf

Documentation

- Memory Solutions
  - Demos on Demand – Memory Interface Solutions with Xilinx FPGAs

    http://www.demosondemand.com/clients/xilinx/001/page_new2/index.asp#35
  - Xilinx Memory Corner

    http://www.xilinx.com/products/design_resources/mem_corner
  - Additional Memory Resources

    http://www.xilinx.com/support/software/memory/protected/index.htm
  - Xilinx Memory Interface Generator (MIG) 2.1 User Guide

    http://www.xilinx.com/support/software/memory/protected/ug086.pdf
  - Memory Interfaces Made Easy with Xilinx FPGAs and the Memory Interface Generator

    http://www.xilinx.com/support/documentation/white_papers/wp260.pdf

Documentation

- Ethernet
  - Virtex-5 Embedded Tri-Mode Ethernet MAC Wrapper Data Sheet

    http://www.xilinx.com/support/documentation/ip_documentation/v5_emac_ds550.pdf

  - Virtex-5 Embedded Tri-Mode Ethernet MAC Wrapper Getting Started Guide

    http://www.xilinx.com/support/documentation/ip_documentation/v5_emac_gsg340.pdf

  - Virtex-5 Tri-Mode Ethernet Media Access Controller User Guide

    http://www.xilinx.com/support/documentation/user_guides/ug194.pdf

  - LightWeight IP (lwIP) Application Examples – XAPP1026

    http://www.xilinx.com/support/documentation/application_notes/xapp1026.pdf

Documentation

- ML501
  - ML501 Overview

    http://www.xilinx.com/ml501

  - ML501 Evaluation Platform User Guide – UG226

    http://www.xilinx.com/support/documentation/boards_and_kits/ug226.pdf

  - ML501 Reference Design User Guide – UG227

    http://www.xilinx.com/support/documentation/boards_and_kits/ug227.pdf

  - ML501 Getting Started Tutorial – UG228

    http://www.xilinx.com/support/documentation/boards_and_kits/ug228.pdf

Documentation

- ML501

  - ML501 Schematics

    http://www.xilinx.com/support/documentation/boards_and_kits/ml501_20061010_bw.pdf

  - ML501 Bill of Material

    http://www.xilinx.com/support/documentation/boards_and_kits/ml505_501_bom.xls